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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,841	02/09/2004	Frank Jansen	M03A210	9767
20411	7590	12/21/2007		
THE BOC GROUP, INC. 575 MOUNTAIN AVENUE MURRAY HILL, NJ 07974-2064			EXAMINER MOORE, KARLA A	
			ART UNIT	PAPER NUMBER
			1792	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/774,841	Applicant(s) JANSEN, FRANK	
	Examiner Karla Moore	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-9, 11-15, 17-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 12-13, 15 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0043216 A1 to Hwang et al. in view of U.S. Patent Publication No. 2004/0194691 A1 to George et al.

Regarding claim 8, Hwang et al. disclose a method for preparing a coated substrate using semiconductor fabrication methods and apparatus (paragraph 1) substantially as claimed and comprising: providing an atomic layer deposition (ALD) arrangement comprising an evacuable chamber (Figure 3, 304; paragraph 41), at least two atomic layer deposition sources (Figures 3 and 4, 308a to 308d; paragraph 42) within the chamber, wherein each atomic layer deposition chamber source is isolated from the remainder of the chamber (using partition wall, 310; paragraph 45), conveying the substrate past each atomic layer deposition source in succession (paragraph 44), and exposing the substrate to said next atomic layer deposition source (paragraph 44). In Hwang et al. it is taught that either the atomic vapor deposition sources or wafer susceptors can be rotated with respect to the other (paragraph 50).

However, Hwang et al. fail to teach performing the method on a polymer film substrate.

George et al. teach that it is known in the art of semiconductor fabrication to perform an ALD method comprising depositing inorganic materials onto a polymer film substrate for the purpose of making ultra-thin, conformal coatings (abstract).

It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have performed an ALD method comprising depositing inorganic materials onto a polymer film substrate in Hwang et al. in order to make ultra-thin, conformal coatings as taught by George et al.

With respect to claim 12, George et al. further teach using the ALD method to form a barrier coating layer on a polymer substrate, wherein the polymer substrate is polyethylene terephthalate, low density polyethylene, high density polyethylene, polypropylene, polycarbonate, polyvinylidene chloride, polyacrylate or polyamide for the purpose of imparting desirable properties to the polymer substrate (paragraphs 16-18 and 53-54).

With respect to claim 13, in Hwang et al., a first atomic layer deposition source is a source of trimethylaluminum (paragraph 46).

With respect to claim 15, in Hwang et al., at least one atomic layer deposition source is an oxidizing agent (i.e. water vapor) (paragraph 46).

With respect to claims 18 and 19, in Hwang et al., an inert gas (i.e. argon) is introduced into the chamber (paragraph 46).

With respect to claim 20, it is taught that the barrier coating deposited on the polymer substrate in George et al. has a thickness of 400 angstroms to 50 angstroms (i.e. between about 40 nm and 5 nm) such that desirable properties are imparted to the polymer substrate (paragraphs 53-54).

Claim 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang et al. and George et al. as applied to claims 8, 12-13, 15 and 18-20 above, and further in view of U.S. Patent Publication No. 2003/0207032 to Ahn et al.

Hwang et al. and George et al. disclose the method for preparing a coated substrate substantially as claimed and as described above.

However, Hwang et al. and George et al. fail to teach the oxidizing agent is oxygen, nitrous oxide and ozone.

Ahn et al. disclose use of oxygen, nitrous oxide and ozone as oxidizing agents along with trimethylaluminum in a semiconductor ALD process for producing a coating of aluminum oxide for the purpose of forming a highly uniform ultra-thin layer (abstract, paragraphs 5, 18 and 30).

It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided oxygen, nitrous oxide or ozone as the oxidizing agent in the coating method of Hwang et al. and George et al. in order to form a highly uniform ultra-thin layer as taught by Ahn et al.

Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,058,430 to Suntola et al. in view of U.S. Patent Publication No. 2004/0184691 A1 to George et al. and U.S. Patent No. 5,300,189 to Kokaku et al.

Suntola et al. disclose a method for preparing a coated substrate substantially as claimed and comprising: providing an atomic layer deposition arrangement comprising an evacuable chamber, and at least two atomic layer deposition sources within the chamber, wherein each atomic layer deposition source is isolated from the remainder of the chamber, conveying a substrate past each atomic layer deposition source in succession, and exposing the substrate to each atomic layer deposition source as the substrate is conveyed past. Several embodiments for achieving this method are disclosed. See Figures 1-5, for example. Suntola et al. further includes the teaching that ALD growth is attainable within several types of growing equipment and that the *essential* features for such growth are the deposition sources temperatures, substrate temperature and stepwise interactions between the substrates and the deposition sources (column 8, rows 38-42). Also see, column 11, rows 5-27, where it is disclosed that further variations and modifications may be made to the explicitly disclosed embodiments.

However, Suntola et al. fails to teach the use of a polymer film substrate as the deposition substrate in the method.

George et al. teach that it is known in the art of semiconductor fabrication to perform an ALD method comprising depositing inorganic materials onto a polymer film substrate for the purpose of making ultra-thin, conformal coatings (abstract).

It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have performed an ALD method comprising depositing inorganic materials onto a polymer film substrate in Suntola et al. in order to make ultra-thin, conformal coatings as taught by George et al.

Suntola et al. and George et al. disclose the invention substantially as claimed and as described above.

However, Suntola et al. and George et al. fail to teach method further includes providing a rotatable substrate source drum having the polymer film substrate wrapped there around, and providing a rotatable collection drum, rotating the substrate source drum and conveying the polymer substrate film into the chamber and rotating the collecting drum and receiving the polymer substrate film exiting the chamber.

Kokaku et al. teach the following provisions in a multilayer processing method wherein a film substrate is conveyed past a plurality of deposition sources on a rotatable drum located in a chamber: providing a rotatable substrate source drum having a substrate film wrapped there around, and providing a rotatable collection drum, rotating the substrate source drum to carry the film substrate into the chamber and rotating the collection drum and receiving the substrate film exiting the chamber for the purpose of forming a multilayer film with high efficiency without uselessly complicating construction of the processing apparatus (Figure 3, abstract and column 5, rows 60 through column 6, row 1).

Given this teaching by Kokaku et al. and the teachings provided by Suntola et al. that an ALD method can be practiced in several types of apparatus given that the

presence of the three essential features that are discussed above and which the apparatus of Kokaku et al. would be capable of providing, it would have been obvious to one of ordinary skill in the art to have provided a rotatable substrate source drum having a substrate film wrapped there around, and provided a rotatable collection drum, rotating the substrate source drum to carry the film substrate into the chamber and rotating the collection drum and receiving the substrate film exiting the chamber in Suntola et al. and George et al. in order to form a multilayer film with high efficiency without uselessly complicating construction of the processing apparatus as taught by Kokaku et al.

Response to Arguments

Applicant's arguments filed 30 March with respect to claims 8, 12-15 and 18-20 have been fully considered but they are not persuasive. The rejections have been maintained and further explanation regarding the rejections is given below.

Applicant's arguments, with respect to the rejection(s) of claim(s) 9 and 17 have been fully considered and are somewhat persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view newly replied reference to Suntola et al.

Regarding the rejections of claims 8, 12-15 and 18-20, at the outset, Examiner points out that Applicant's claims were examined in light of the following directive: During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification." In re Prater, 415 F.2d 1393, 1404-05,

162 USPQ 541, 550-51 (CCPA 1969). In the instant case, Applicant has chosen to use verbiage (e.g. a polymer film substrate) to express the claimed invention that need not necessarily be defined as narrow as Applicant argues is reasonable. For example, when such verbiage is considered in terms of what it would mean to one of ordinary skill in the art, a valid interpretation is "a substrate comprising a polymer film coating". This is the interpretation used in the rejections of the pending claims. Applicant argues that there is nothing in the specification to support the Examiner's interpretation of the claim language. Examiner disagrees and would argue that at the very least there is also nothing in the specification that would preclude such an interpretation and that given the above directive; such an interpretation is not incorrect. It is also noted that the above interpretation would most likely not be fair, if the present specification included a passage indicating that for the purposes of the disclosed and claimed invention a reference to a "polymer film substrate" is tantamount to the reference of a substrate in web-form, of continuous (or indeterminate or elongated) length, a running-length-work substrate or even a flexible substrate, etc., as opposed to a discrete, rigid or wafer-like substrate. However, this is not the case. In fact, paragraph 14 of Applicant's indicates that typically ALD is performed on wafers. Examiner does not argue that Applicant's preferred embodiment appears to be that of a flexible, elongated substrate, but that the claimed invention is not limited to such an embodiment as written. All of the above terms, referring to types of substrates, are well-known in the art and routinely used to describe the type of substrates that Applicant intends to claim and distance themselves from, respectively. In fact, the term flexible substrate is actually used in Applicant's

disclosure as an example. If Applicant intends to limit the claims to such an embodiment, Applicant should positively set forth such an embodiment by using the appropriate language in the claims, rather than using vague verbiage that can be interpreted broadly to include substantially different types of substrates.

Conclusion

The prior art made of record and not relied upon may still be considered pertinent to applicant's disclosure and claimed invention. For example, U.S. Patent No. 5,224,441 to Felts et al. discloses that the use of an apparatus comprising rotatable substrate source and collection means and a rotatable drum in-between can be advantageous in performing a deposition method on a polymer film substrate, wherein the polymer film substrate is an elongated, flexible, plastic substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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KARLA MOORE
PRIMARY EXAMINER

10 December 2007